

# EXERCISES

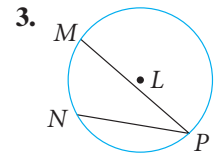
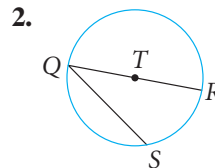
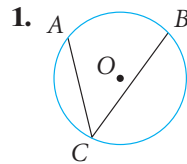
For more practice, see *Extra Practice*.

## Practice and Problem Solving

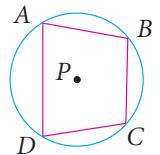
### A Practice by Example

**Example 1**  
(page 599)

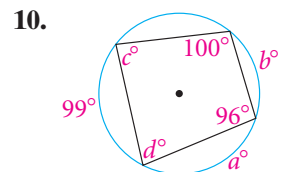
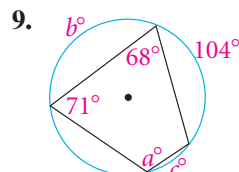
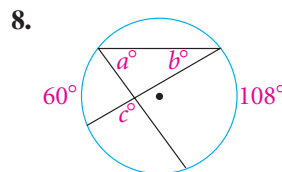
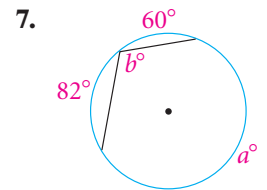
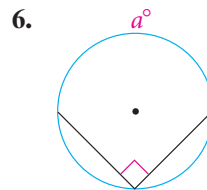
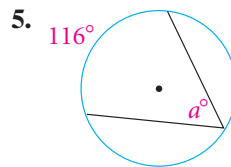
Identify the inscribed angle and its intercepted arc.



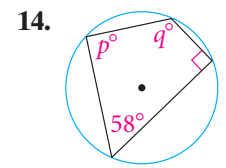
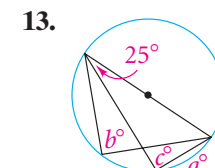
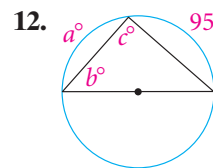
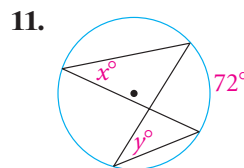
4. a. Name the four inscribed angles and their intercepted arcs.  
b. Which angles appear to intercept major arcs? What kind of angles do these appear to be?



Find the value of each variable.

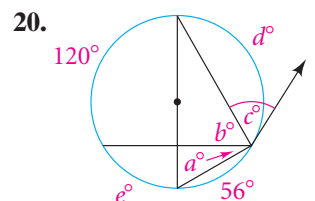
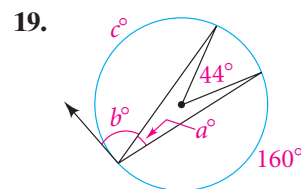
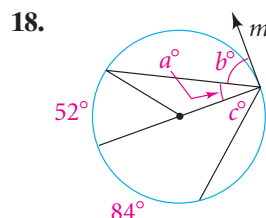
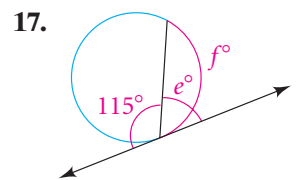
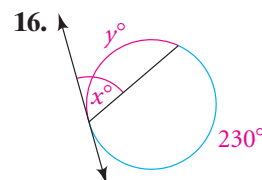
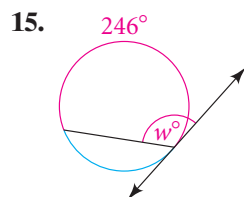


**Example 2**  
(page 600)



**Example 3**  
(page 601)

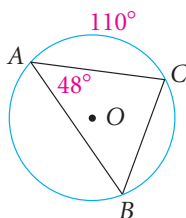
Find the value of each variable. You may assume that rays that appear to be tangent are tangent.



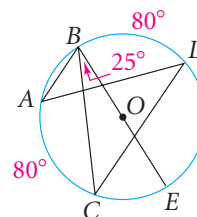
# B Apply Your Skills

Find each indicated measure for  $\odot O$ .

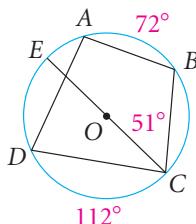
21. a.  $m\widehat{BC}$   
b.  $m\angle B$   
c.  $m\angle C$   
d.  $m\widehat{AB}$



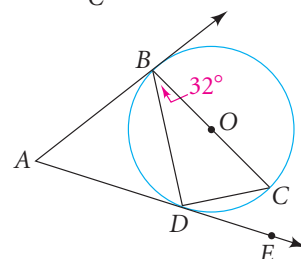
22. a.  $m\angle A$   
b.  $m\widehat{CE}$   
c.  $m\angle C$   
d.  $m\angle D$   
e.  $m\angle ABE$



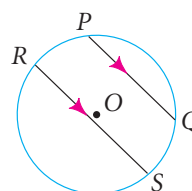
23. a.  $m\widehat{EA}$   
b.  $m\widehat{BC}$   
c.  $m\angle A$   
d.  $m\angle B$   
e.  $m\angle BCD$   
f.  $m\angle D$



24. a.  $m\widehat{DC}$   
b.  $m\widehat{BD}$   
c.  $m\angle BCD$   
d.  $m\angle BDC$   
e.  $m\angle ABC$   
f.  $m\angle ADB$



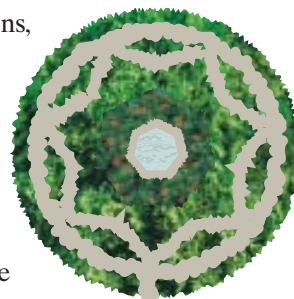
25. **Writing** Copy the diagram at the right on your paper. Draw chord  $\overline{RQ}$ . Explain why  $m\widehat{PR} = m\widehat{QS}$ .



26. a. **Open-Ended** Sketch a trapezoid inscribed in a circle. Repeat several times using different circles.  
b. **Make a Conjecture** What kind of trapezoid can be inscribed in a circle? Justify your response.



27. **Landscape Architecture** Some circular English gardens, like the one shown here, have paths in the shape of an inscribed regular star.  
a. Find the measure of an inscribed angle formed by the star in the garden shown here.  
b. What is the measure of an inscribed angle in a garden with a five-pointed star?



28. **Critical Thinking** A parallelogram inscribed in a circle must be what kind of parallelogram? Explain.

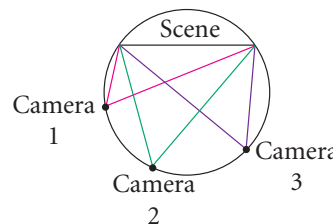


- Graphing Calculator** The diameter of a circle is 10 cm. Find the dimensions of the largest figure of each type that can be inscribed in the circle. (Hint: Use techniques demonstrated in the Exploration on page 536.)

29. a rectangle      30. a triangle      31. a right triangle



32. **Television** The director of a telecast wants the option of showing the same scene from three different views.  
a. Explain why cameras in the positions shown in the diagram will transmit the same scene.  
b. **Critical Thinking** Will the scenes look the same to the director when she views them on the control room monitors? Explain.



**Critical Thinking** Decide whether each statement is true or false. Give a counterexample for each false statement.

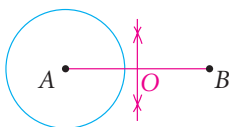
33. If two angles inscribed in a circle are congruent, then they intercept the same arc.  
34. If an inscribed angle is a right angle, then it is inscribed in a semicircle.



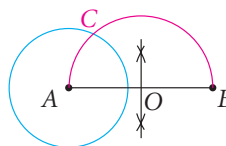
## Need Help?

A regular star (Exercise 27) has congruent sides. Also, the angles "pointing out" are congruent, as are the angles "pointing in."

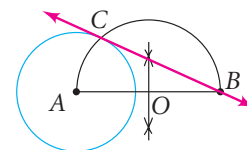
35. A circle can always be circumscribed about a quadrilateral whose opposite angles are supplementary.
36. **Constructions** The diagrams below show the construction of a tangent to a circle from a point outside the circle. Explain why  $\overleftrightarrow{BC}$  must be tangent to  $\odot A$ . (Hint: Copy the third diagram and draw  $\overline{AC}$ .)



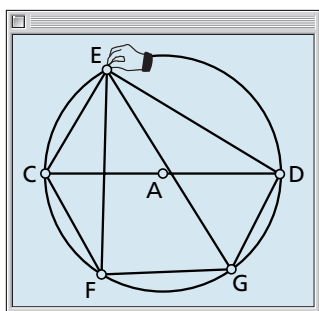
**Given:**  $\odot A$  and point  $B$ .  
Construct the midpoint of  $\overline{AB}$ . Label the point  $O$ .



Construct a semicircle with radius  $OA$  and center  $O$ . Label its intersection with  $\odot A$  as  $C$ .



Draw  $\overleftrightarrow{BC}$ .



37. **Technology** Construct  $\odot A$  and the chords shown with geometry software.
- As you move  $E$  on  $\widehat{CED}$  between  $C$  and  $D$ , which inscribed angles remain congruent?
  - Which inscribed angle remains a right angle?
  - Which inscribed angles remain supplementary in quadrilateral  $EFGD$ ?
38. **Constructions** Use Corollary 2 of Theorem 11-9 to construct a right triangle given one leg and the hypotenuse.
39. **Constructions** Draw two segments. Label their lengths  $x$  and  $y$ . Construct the geometric mean of  $x$  and  $y$ . (Hint: Construct a circle with diameter  $x + y$ . Then find a right triangle whose altitude to the hypotenuse has the length you seek.)

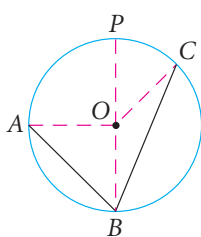


**Challenge Proof** Write a two-column proof, paragraph proof, or flow proof.

40. Inscribed Angle Theorem, Case II

**Given:**  $\odot O$  with inscribed  $\angle ABC$

**Prove:**  $m\angle ABC = \frac{1}{2}m\widehat{AC}$

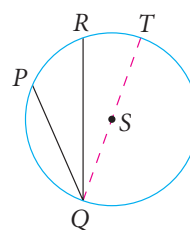


Hint: Use the Inscribed Angle Theorem, Case I.

41. Inscribed Angle Theorem, Case III

**Given:**  $\odot S$  with inscribed  $\angle PQR$

**Prove:**  $m\angle PQR = \frac{1}{2}m\widehat{PR}$

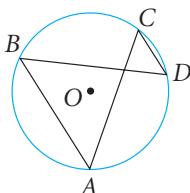


Hint: Use the Inscribed Angle Theorem, Case I.

42. Inscribed Angle Theorem, Cor. 1

**Given:**  $\odot O$ ;  $\angle A$  intercepts  $\widehat{BC}$ , and  $\angle D$  intercepts  $\widehat{BC}$ .

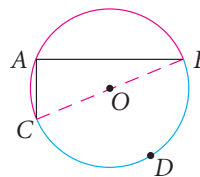
**Prove:**  $\angle A \cong \angle D$



43. Inscribed Angle Theorem, Cor. 2

**Given:**  $\odot O$  with  $\angle CAB$  inscribed in a semicircle

**Prove:**  $\angle CAB$  is a right angle.





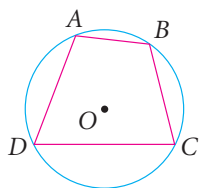
### Need Help?

In Exercise 45, let  $\overline{GH}$  first be a diameter.

44. Inscribed Angle Theorem, Cor. 3

**Given:** quadrilateral  $ABCD$  inscribed in  $\odot O$

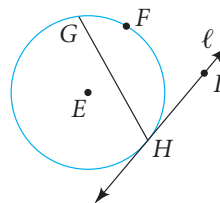
**Prove:**  $\angle A$  and  $\angle C$  are supplementary.  
 $\angle B$  and  $\angle D$  are supplementary.



45. Theorem 11-10

**Given:**  $\overline{GH}$  and tangent  $\ell$  intersecting at  $H$  on  $\odot E$

**Prove:**  $m\angle GHI = \frac{1}{2}m\widehat{GFH}$

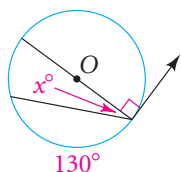


## Standardized Test Prep

### Multiple Choice

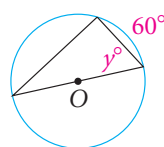
In Exercises 46 and 47, what is the value of each variable?

46.



- A. 25
- B. 35
- C. 45
- D. 65

47.



- F. 20
- G. 30
- H. 50
- I. 60



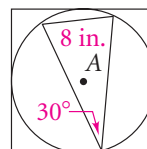
### Take It to the NET

Online lesson quiz at  
[www.PHSchool.com](http://www.PHSchool.com)

Web Code: afa-1103

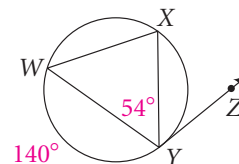
48. In the figure at the right, a square is circumscribed about  $\odot A$ . What is the area of the square?

- A.  $64 \text{ in.}^2$
- B.  $192 \text{ in.}^2$
- C.  $256 \text{ in.}^2$
- D.  $(256 + 16\sqrt{3}) \text{ in.}^2$



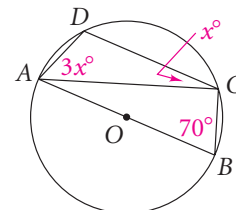
### Short Response

49. a. Explain how you can find  $m\angle XYZ$ .  
b. Find  $m\angle XYZ$ .



### Extended Response

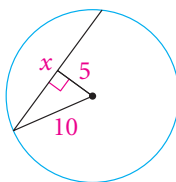
50. Use the figure at the right.  
a. What is  $m\angle D$ ? Explain.  
b. What is  $m\angle ACB$ ? Explain.  
c. Use an equation to find the value of  $x$ .



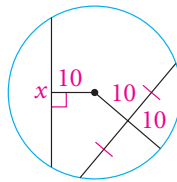
**Lesson 11-2**

Find the value of  $x$  to the nearest tenth.

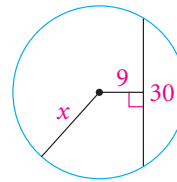
51.



52.



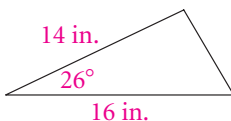
53.



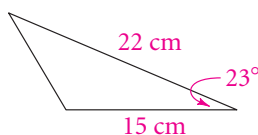
**Lesson 9-5**

Find the area of each triangle. Give answers to the nearest tenth.

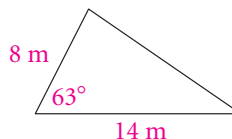
54.



55.

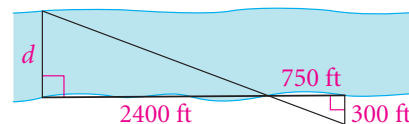


56.



**Lesson 8-3**

**Indirect Measurement** To find the width of a river, you have made the measurements shown in the sketch.



57. Explain why the triangles are similar.

58. a. Find the width of the river in feet.  
b. Find the width of the river in miles.